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ABSTRACT

Comprehensive high schools have developed into systems serving the high-achieving, college-bound students and the students who need remediation in basic skills, with little attention being paid to the large number of students who fall between these two levels. Little attention is paid to educating students for midlevel jobs that require more education today than they did previously. Attempting to change this situation, educators have developed a variety of learning arrangements and alternative approaches. They include the following: (1) cognitive apprenticeship, a problem-centered approach in which students become active learners through problem solving; (2) tech prep, which links vocational education in a secondary school to postsecondary technical education; (3) integrated academic and vocational education; (4) career magnet schools and academies that integrate academic and vocational education with a theme or focus school; (5) work-based youth apprenticeship, with a structured curriculum and a significant amount of education taking place on the job; (6) cooperative education, a less-structured approach, with students going to school part time and working part time; and (7) school-based enterprise, activities that encourage students to learn and use academic and entrepreneurship skills. These options should be measured against seven criteria to ensure that a model can be developed for building the middle. The models most likely to succeed should have the following design elements: the pedagogic and curricular principles of cognitive apprenticeship, the organizational elements of academic and vocational integration, the articulation and occupational cluster principles of tech prep, and the rigorous skills certification system of work-based youth apprenticeship. (KC)

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BUILDING THE MIDDLE

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Introduction

Too many young people complete high school equipped neither for college nor for the training required to enter middle-level jobs. What is worse, our nation's schools have no coherent strategy for educating non-college-bound students or for helping them develop the competence required for middle-level jobs.

Attempts to create that strategy—which we call "building the middle"—have generated a flurry of learning arrangements and alternative models. The purpose of this paper is not to select a winner among the various models and options, but to provide a template for building a strong school-to-work transition program emphasizing the most valuable contributions from each of the approaches.

Why the Sudden Interest in Building the Middle?

Economic Factors. The full realization that we seriously have to prepare all students emerged in the 1980s. Throughout that decade, the less-educated were increasingly less likely to be employed, and, when they worked, earned increasingly less than the better-educated.

The wage and employment difficulties of the less-educated reflect a deep shift in demand in the American economy. As American industries convert from mass to flexible production, the need for low-skilled employees is reduced, and the need for better-educated, high-skilled workers increases.

The skill requirements of our economy have changed in two ways: First, occupations that need higher-skilled workers are growing faster than those that rely on lower-skilled workers. Second, the skills in many occupations have been restructured: a job may go by the same name, but the skills needed for that job have changed.

The new economy requires the integration of traditionally separate functions (e.g., design, engineering, marketing), flatter organizational structures, and decentralization of responsibilities. This new approach gives lower-level employees more responsibility and discretion, and incorporates into their jobs many supervisory, planning, and quality control functions previously reserved for higher-level employees. In short, skill is more valuable and the lack of skill more of a liability than before.

The Allocation of Educational Resources. Most comprehensive high schools have no curricular structure for preparing students for middle-skill jobs. Curricula are organized around either college-level preparation or basic skills remediation. These priorities are mirrored in counseling, where attention goes to the more rewarding relationships with high-achieving students or to those with the most severe behavioral and academic problems. Students who are neither high academic achievers nor have severe problems simply fall through the cracks.

With increases in academic graduation requirements, vocational education has become nearly invisible in the comprehensive high school. What remains is a tattered and incoherent set of offerings—with only the most tenuous connection to the world of work—serving primarily as places to absorb students designated as "remedial" or "at risk."

The Options

Attempting to change this situation, educators have developed a variety of learning arrangements and alternative approaches. For simplicity, we refer to these various efforts as options. Although the options are not mutually exclusive, and elements from different ones can be and often are combined, we discuss each option separately to help the reader distinguish each one from the others.

Cognitive Apprenticeship. This option rethinks the nature of instruction and the way classrooms are organized. It turns the learning situation into a community of expert practice, where instruction is problem-centered, not didactic, and knowing and doing are integrated. Cognitive apprenticeship transforms the role of the teacher from dispenser of knowledge to facilitator, coach, and guide. It also changes the roles of students, from passive, empty vessels receiving knowledge to active participants who take responsibility for their own learning. This option, a modification of traditional apprenticeships, flows from a theory of learning based on cognitive science about how people learn most effectively and naturally. The term "cognitive" should not be read to mean "academic;" cognitive apprenticeship is expected to fit both "academic" and "vocational" subjects.

Tech Prep. Tech prep links ("articulates") vocational education in a secondary school to technical education in a postsecondary institution. It aligns academic and vocational course work into a sequence of courses organized around a work-related education that gives students a set of skills certified by an associate degree as a credential. This credential leads to middle-level jobs. In some tech prep programs, the curriculum is designed in collaboration with the business community, and often there are work opportunities at various stages of the program. Tech prep is generally viewed as the technical education alternative to the college prep program.

Integrated Academic and Vocational Education. This option combines and integrates academic and vocational course work. Although it can be done in a number of ways, including team teaching and departmental clusters, this option implies newly designed course work, a reorganization of the faculty, and teacher collaboration. In the ideal implementation of this option, students follow a career path incorporating academic and vocational course work, and academic and vocational teachers are on equal footing as members of the same faculty. Integrated programs are designed to end the stratification of schooling that distinguishes between more-advantaged students who receive educationally rich instruction and less-advantaged students who receive a remedial, watered-down education. Integrated

programs thus eliminate tracking and replace teacher-driven basic skills instruction with problem-centered instruction.

Career Magnet Schools and Academies. Career magnets and academies integrate academic and vocational education within a theme or focus school. The theme is an industry, such as aviation, agriculture, or fashion. Some career magnets follow the "academy" model as a school within a school; others operate school-wide. Academic subjects are taught as related functional disciplines. Rather than providing limited job-specific skills, career magnets and academies provide broad generic skills. The school's career orientation grounds cognitive development in a practical, hands-on setting, and aligns the curriculum in a way impossible in the "shopping mall" model of the traditional high school.

Academies are always schools-within-schools rather than stand-alone schools. Unlike career magnets, which are open to all students, academies usually target students thought to be in danger of dropping out.

Career magnets and academies maintain strong collaborative links with local business and industry. Employers from the career field are directly involved in program planning, serve as informal staff (speakers, supervisors, mentors), and provide summer and school-year employment as part of the curriculum.

Work-based Youth Apprenticeship. This option, inspired by the German dual apprenticeship system, has four essential components.

1. It is designed to be an integral part of the basic education of a broad cross-section of youth. It is not for specific occupations or specific target groups.

2. Its educational content integrates and coordinates academic and vocational content. Apprenticeship programs are designed to teach broad employability skills.

3. A significant part of the basic education is to take place on the job, complemented by classroom instruction.

4. This option requires a system of credentials for students who successfully complete the program. These credentials certify achievement for specified levels of skills.

Cooperative Education. Compared to the other options, this one is less formal, less standardized, and has fewer well-defined elements. Students usually spend the morning in school classes recommended and approved by the school co-op coordinator, and the last half of their day working in a paid job for which they receive high school credits. The students do not usually have specially designed course work, and they attend traditional vocational and academic classes with non-cooperative-education students.

Although it uses the workplace as a learning site, co-op education makes a less purposive use of it than youth apprenticeship. Whereas apprenticeship is seen as the first job in a career sequence, co-op education is more often viewed as a temporary training station.

School-based Enterprise. School-based enterprise is an activity that engages groups of students in providing services or producing goods for sale (e.g., restaurants, print shops, auto repair shops, school newspapers). The objectives are to teach entrepreneurship, provide application of skills and knowledge taught in other courses, and enhance students' social and personal development.

Design Criteria for Building the Middle

The overriding objective of building the middle can be easily stated. It is to create learning arrangements or options that are so highly motivating and so effective that all students develop the knowledge and skills sufficient for middle-skill and middle-wage jobs or for training that leads to them. But how does an option have to be structured, and what does it have to do, to achieve that objective?

To stimulate discussion of these questions, we offer the following criteria. Based on our review of the research conducted in this area by the National Center for Research in Vocational Education (NCRVE), we think that these are essential elements. The first six criteria involve the nature of the learning arrangement. The seventh addresses replication and diffusion of the arrangement.

Criterion 1. The option should set up educationally rich and problem-rich learning activities that reflect the knowledge demands of the work contexts in which knowledge and skill have to be used.

This criterion sets two requirements for the learning situation. One is that the situation should mirror what people have to know and how they have to use what they know in the workplace. The other requirement is that the learning activities must develop broadly applicable knowledge and skills.

The key issue for learning is the same for schools and workplaces. A company that organizes work or a school that organizes learning around situation-specific knowledge or as a set of segmented tasks will limit what its workers or its students learn.

Criterion 2. The option should create a "community of expert practice," where the adults do more than talk about the practices of that community and play the role of subject-matter coach during the learning process.

An approach that takes a significant step toward eliminating the division between in-school and out-of-school worlds is to create a "community of expert practice." This can be done for academic as well as vocational subjects. In such a community, the teacher insures that the values appropriate to the subject matter (e.g., mathematics or interior design) are respected and that the challenges and constraints of the professional community are present in the learning situation. The teacher, an expert at his or her craft, gradually hands over responsibility for learning to the learners. Learners begin with simple operations as they observe the master's execution of complex skills.

Criterion 3. The option should develop knowledge and skill efficiently.

A learning situation is efficient if it motivates learners to learn more quickly, with greater understanding, and with greater retention and transferability. A learning sequence is efficient if courses are coordinated with each other across the K-12 grades, between secondary and postsecondary systems, and within the postsecondary system.

Criterion 4. The option should engage employers for help in curricular design, the creation of work-experience positions, and commitments to hire the program's graduates.

An active role for employers increases the chances that the learning situation can be updated to reflect what constitutes expert practice in an industry—current technology, modern work practices, and the knowledge needed to make a range of judgments and decisions in that community. The option should also find ways to knit together institutions that develop skills and those that hire skills to ease the transition of students from one to the other.

Criterion 5. The option should make the relationships and tradeoffs between different training investments clear to students.

The option should be structured so that it generates information to students about the payoffs to be expected from investing in training for a particular occupation in a particular program, that is, the wages, the employment opportunities and trends, and the opportunities for advancement; the quality of particular training programs; and the career paths within families of occupations, such as health occupations or the fashion industry. Options organized around individual occupations do not convey information about career paths. Those organized around a family of occupations do.

In short, an option must not simply provide training; it must also provide information that gives students the power to make informed decisions about their training investments and their careers.

Criterion 6. The option should be designed to prevent its being captured by the more advantaged or abandoned to the less advantaged.

Any system organized around training for middle-skill jobs must be visibly connected to postsecondary education. Parents understand that college—and the academic track that leads to it—is the only path, today, that gives their children an opportunity for an economically viable future.

However, any system attractive to more-advantaged families runs the risk of being captured by them, which has happened to career magnets in some cities. One way to deal with the problem is to increase the number of such schools—in other words, reduce the scarcity. Another approach is to require each school to accept a specified proportion of students from different achievement levels.

Criterion 7. The option should have the potential to scale up into a national system. This means that it should replicate with quality and diffuse broadly.

An option should not create yet another isolated program, but rather one that can be a part of a work preparation system that has the potential to be national in scale. There are, of course, barriers to diffusion that all educational innovations face, but in evaluating options, one should ask whether the option itself has characteristics that can impede or enhance its diffusion.

Assessing the Strengths of the Options

Judged by these criteria, what does each option have to offer? The following brief discussions summarize our analysis of each option, not as the option tends to get implemented, but as it would appear in its model or ideal form.

Cognitive Apprenticeship. In its essence, a cognitive apprenticeship develops educationally rich and problem-rich learning situations, creates a community of expert practice, and is highly motivating. Also, a cognitive apprenticeship integrates abstract academic and functional learning and thus undercuts any potential for capture by advantaged students or abandonment to the less-advantaged.

Tech Prep. Tech prep is an option specifically designed to insure the efficiency of learning *sequences* and to direct and guide students along career paths. With a chance for advanced placement in a community college and the opportunity to develop workplace competencies, students are motivated to stay in school.

Integrated Academic and Vocational Education. This option can create learning activities that reflect the demands of the workplace and the contexts in which knowledge and skills must be used. Integrated programs are specifically designed to end the stratification of schooling that distinguishes between more-advantaged and less-advantaged students. Moreover, students are guided in planning their program and are thus better able to plan for a continuous educational program leading to the acquisition of the skills and knowledge needed for increasingly higher-skill jobs.

Career Magnets and Academies. Because of their career focus, career magnets and academies are designed to provide an education closely linked to the learning and performance demands of the workplace. Magnets and academies are designed to make educationally rich subject matter more available to those students usually denied access to such an education. These options do well in engaging employers in curricular design, the creation of work experience positions, and commitments to hire their graduates.

Work-based Youth Apprenticeship. This option has a strong potential to set up educationally rich learning situations that create a community of expert practice, develop knowledge and skill efficiently, and reflect the knowledge demands of the work contexts in which knowledge is to be used. Work-based youth apprenticeship is unique in its design of a skills certification program. When that system is created, it will lay the groundwork for measuring and signaling the quality of programs and will

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encourage employers to hire the graduates of youth apprenticeship programs.

Cooperative Education. The strength of cooperative education is that it creates work experience positions for students. However, it has no system of credentials, and the nature and quality of the learning seem ad hoc.

School-based Enterprise. Such enterprises might develop knowledge and skill efficiently and can be highly motivating. But this option does not specify the content or quality of the curriculum or the expertise of the adults in the situation. This option is not designed to be a part of a work preparation system.

Where Do We Go From Here?

There are too many options right now; the field needs to eliminate or combine options in order to focus energies and resources. The field is struggling with whether the solution should be primarily work-based or school-based. On the evidence so far, we argue that it should be school-based, with systematic but minor workplace connections.

Beyond a doubt, many school-based programs—even many vocational ones—are divorced from the needs of the workplace, and students emerge from these programs lacking both the knowledge and skills needed at work and the ways in which knowledge and skills are used in the workplace. From the perspective of the schools' failure, a work-based system sounds reasonable.

However, a work-based system would require that employers assume heavy educative responsibility for about 70 percent of America's late adolescents. Experience indicates that the employing sector cannot and will not bear this weight. It might be able to develop and maintain a high quality system that serves a small percent of eligible youth. Or it might be able to support a larger system skewed toward employers' work, not apprentices' educational interests. Our reading is that for the foreseeable future the employing sector will not support a national, work-based system that stays focused on apprentices' learning needs.

If the K-12/postsecondary system is to bear the weight of building the middle, it has to be redesigned to provide for *all* students, not just the college-bound or those who need remediation. To begin that redesign, we propose a national work-preparation system for middle-skill and middle-wage jobs, with the following design elements.

- *The pedagogic and curricular principles of cognitive apprenticeship.* This insures an educationally rich learning environment; a community of expert practice as the learning situation; a motivating learning environment; and teachers in the roles of coaches. It engages both head and hand, eliminating the separation between academic and vocational.
- *The organizational elements of academic and vocational integration.* These elements need to be in place to implement the pedagogic and curricular principles of cognitive apprenticeship.
- *The articulation and occupational cluster principles of tech prep.* Articulation insures a coherent curricular sequence. Occupational clustering insures broad training that positions students to move among the occupations, and it creates a cognitive map of how one moves.
- *The rigorous skills certification system of work-based youth apprenticeship.* If employers have a sense of ownership in the system, they are more apt to recognize its certificates in hiring and wage decisions. If the skill certifications are rigorous, they will operate as a quality control on work preparation programs. And if the skills certification system is national, it will lay the groundwork for a national market for graduates of the built middle.

These elements can occur in different school-based institutional arrangements: career magnets, career academies, tech prep programs, and schools organized around integration principles.

Building the middle will require an intelligent and efficient infrastructure to support the process. Aside from the tangle of regulations and rules, the following fundamental areas will need to be redesigned:

- Quality assurance mechanisms
- Curricula
- Professional development
- Knowledge flows

All of these have implications at the level of individual schools and school districts, but making these changes will require national or state leadership in many institutional communities, including the assessment design community, employers and trade associations, and schools of education.

Careful attention to the above-mentioned central infrastructure issues will lay the foundation for the construction of a quality system. In our judgment, the approach we have outlined capitalizes on what seem to be the individual strengths of the options being tried today. If well-developed and implemented, this approach might resolve most, although not all, of the design dilemmas. More importantly, this approach offers a coherent strategy for taking seriously the education of all of our nation's students.

This Brief is a distillation of a report by the same title by the authors. The original report, a synthesis of work by National Center for Research in Vocational Education (NCRVE) researchers, is available from NCRVE. To order the report, call the NCRVE publication department at 800-637-7652. Publication and dissemination of this Brief is supported, in part, by the William T. Grant Foundation Commission on Work, Family, and Citizenship.